REMARKS

Claims 1-15 are pending in this application. Claims 1 and 8 have been amended. Support for the amendments is found in the specification and claims as filed.

Objection to the Specification

The specification has been objected to because of formalities, including the word "tr at d" on page 8 at line 1, and the word "w re" on page 11 at line 1. The specification has been amended to correct the informalities. In view of the foregoing amendment, Applicants respectfully request withdrawal of the objection.

Claim Rejections - 35 U.S.C. § 112, second paragraph

Claims 1 and 12 have been rejected under 35 U.S.C. §112, second paragraph, as not providing enablement for a chemical other than Fischer-Tropsch products. Claim 1 is directed to Fischer-Tropsch products, the Fischer-Tropsch products comprising a syncrude or a chemical. Chemicals other than Fischer-Tropsch products are not recited. However, Claim 1 and Claim 8 have been amended to delete reference to a "chemical" or "syncrude" so as to clarify the claimed subject matter.

In view of the foregoing amendment, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 103(a)

Claims 1-15 have been rejected under 35 U.S.C. §103(a) as obvious over Benham et al. (U.S. 5,763,716) in view of Fiato et al. (U.S. 4,621,102). To articulate a *prima facie* case of obviousness under 35 U.S.C. §103(a), the PTO must, *inter alia*, cite prior art that teaches or suggests all the claimed limitations. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974).

Independent Claim 1 recites "[a] process for synthesis of a Fischer-Tropsch product, the process comprising: providing self-supported precipitated α-Fe_2O_3-based Fischer-Tropsch catalyst particles, wherein the self-supported precipitated α-Fe_2O_3-based Fischer-Tropsch catalyst particles are produced by heat treating precipitated α-Fe_2O_3-based particles at a temperature of from 320°C to 500°C; and contacting a synthesis gas with the self-supported precipitated α-Fe_2O_3-based Fischer-Tropsch catalyst particles in a Fischer-Tropsch slurry-bed reactor, whereby a Fischer-Tropsch product is obtained." Independent Claim 8 recites "[a] process for synthesis of a Fischer-Tropsch product, the process comprising: providing self-supported precipitated α-Fe_2O_3-based Fischer-Tropsch catalyst particles, wherein the self-supported precipitated α-Fe_2O_3-based Fischer-Tropsch catalyst particles are produced by heat treating precipitated α-Fe_2O_3-based particles at a temperature of from 320°C to 500°C, whereby breakage resistance of the catalyst particles is increased; and contacting a synthesis gas with the self-supported precipitated α-Fe_2O_3-based Fischer-Tropsch catalyst particles in a Fischer-Tropsch slurry-bed reactor, whereby a Fischer-Tropsch product is obtained, wherein the increased breakage resistance of the catalyst particles inhibits formation of catalyst fines in the Fischer-Tropsch slurry-bed reactor, such that performance of a solid separation system employed in the process is maintained."

Benham et al. discloses heating an iron-based catalyst in air to about 600 °F (about 315 °C). This converts hydrous iron oxide Goethit (Fe_2O_3 H_2O) to Hematite (Fe_2O_3), to yield an annealed catalyst that is "ready for induction or activation and use" See col. 11, lines 63-67 and col. 10, lines 1-2. The annealed catalyst can be activated by heating the hematite in the presence of carbon dioxide (optionally also in the presence hydrogen), whereby the hematite is converted to Cementite (Fe_3C) – an iron carbide. See col. 10, lines 26-45. It is the iron carbide catalyst that is employed in the Fischer-Tropsch reaction, and not the Hematite, which is referred to as an "iron catalyst precursor." See col. 11, lines 27-30. Accordingly, Benham et al. teaches conducting a Fischer-Tropsch reaction in the presence of an iron carbide, and Hematite as a catalyst precursor. Benham et al. does not teach a process for synthesis of a Fischer-Tropsch product that utilizes self-supported precipitated α-Fe_2O_3-based Fischer-Tropsch catalyst particles that are produced by heat treating precipitated α-Fe_2O_3-based particles at a temperature of from 320°C to 500°C.

Fiato et al. teaches the use of iron manganese spinels (corresponding to chemical formula $(Fe_{1-x}Mn_x)_3O_4$) as catalysts in Fischer-Tropsch synthesis. In Example 5 of Fiato et al., a spinel catalyst prepared according to the method of Fiato et al. is compared to a "precipitated Fe-Mn oxide" prepared according to the procedure set forth by Maiti et al. (Appl. Cat. 16(2), 215 (1985)). One skilled in the art recognizes that the Maiti et al. catalyst referred to in Example 5 comprises iron manganese spinels and carbides, and not iron in the form of α-Fe_2O_3.

Maiti et al. discloses iron manganese spinels and carbide for use as catalysts in Fischer-Tropsch synthesis. Iron manganese oxides are subjected to pretreatments, including calcination followed by reduction in the presence of H_2, before they are used in a Fischer-Tropsch synthesis reaction. See page 217, first full paragraph, and Table 1. Maiti et al. teaches that the crystal phase composition of the calcined iron manganese oxide includes iron in the form of α-Fe_2O_3 (see Samples D1 and D2 in Table 1). Such catalyst precursors are not employed as catalysts in a Fischer-Tropsch synthesis reaction, however. Instead, they are subjected to a reduction step prior to use, which converts the α-Fe_2O_3 to carbides and mixed spinel.

Accordingly, Benham et al., Fiato et al., and Maiti et al. (referred to in Example 5 of Fiato et al.) teach Fischer-Tropsch synthesis reactions using iron carbides (Benham et al.) or iron manganese spinels and carbides (Fiato et al. and Maiti et al.) as catalysts. These references only teach α-Fe_2O_3-based particles as catalyst precursors that are subjected to a reduction step to convert the particles to spinels and/or carbides prior to use as Fischer-Tropsch catalysts. None of the cited references teaches α-Fe_2O_3-based catalyst particles for use in a Fischer-Tropsch synthesis.

Moreover, there is no suggestion or motivation to modify or combine the cited references to arrive at Applicants' invention as claimed. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). While the cited references disclose iron in the form of α-Fe_2O_3 (Hematite), it is only as a catalyst precursor that undergoes further treatment to convert it into a carbide or spinel form prior to use in a Fischer-Tropsch synthesis. In referring to earlier studies of iron-containing Fischer-Tropsch catalysts, Benham et al. teaches that "the high activity of the catalyst was correlated with the presence of iron carbides after the activation procedure." Fiato et al. and Maiti et al. also teach the high activity in Fischer-Tropsch synthesis observed for carbided catalysts. Considering the teachings of the references as a whole, one skilled in the art desiring a catalyst of high activity would select a reduced or carbided iron catalyst, and not a catalyst comprising iron in α-Fe_2O_3 form.

Accordingly, Applicants respectfully request withdrawal of the rejection.

Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number below.

Respectfully submitted,

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